

7178117

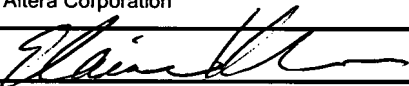
PTO/SB/21 (04-07)

Approved for use through 09/30/2007. OMB 0651-0031

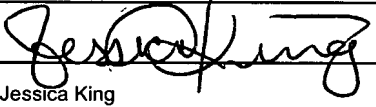
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| | | |
|---|------------------------|---------------|
| TRANSMITTAL FORM (to be used for all correspondence after initial filing) | Application Number | 10/821,466 |
| | Filing Date | April 8, 2004 |
| | First Named Inventor | Yu, et al. |
| | Art Unit | 2825 |
| | Examiner Name | Mr. Paul Dinh |
| Total Number of Pages in This Submission | Attorney Docket Number | A1168 |

| ENCLOSURES (Check all that apply) | | |
|---|--|---|
| <input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53 | <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD | <input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): Certificate of Correction Return Receipt Postcard |
| Remarks The first-named inventor should read Zunhang Yu, not Zunghang Yu as currently shown. Please enter the certificate of correction on the issued patent. | | |
| SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT | | |
| Firm Name | Altera Corporation | |
| Signature |  | |
| Printed name | Elaine K. Lee | |
| Date | May 1, 2007 | Reg. No. 41,936 |

Certificate
MAY 11 2007
of Correction

| CERTIFICATE OF TRANSMISSION/MAILING | | |
|---|---|-------------|
| I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below: | | |
| Signature |  | |
| Typed or printed name | Jessica King | Date 5/1/07 |

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

MAY 11 2007

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL For FY 2007

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 100.00

Complete if Known

Application Number 10/821,466
Filing Date April 8, 2004
First Named Inventor Yu, et al.
Examiner Name Mr. Paul Dinh
Art Unit 2825
Attorney Docket No. A1168

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify):

☒ Deposit Account Deposit Account Number: 502300 Deposit Account Name: Altera Corporation

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee
☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☐ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

| Application Type | FILING FEES | | SEARCH FEES | | EXAMINATION FEES | | Fees Paid (\$) |
|------------------|-------------|-----------------------|-------------|-----------------------|------------------|-----------------------|----------------|
| | Fee (\$) | Small Entity Fee (\$) | Fee (\$) | Small Entity Fee (\$) | Fee (\$) | Small Entity Fee (\$) | |
| Utility | 300 | 150 | 500 | 250 | 200 | 100 | |
| Design | 200 | 100 | 100 | 50 | 130 | 65 | |
| Plant | 200 | 100 | 300 | 150 | 160 | 80 | |
| Reissue | 300 | 150 | 500 | 250 | 600 | 300 | |
| Provisional | 200 | 100 | 0 | 0 | 0 | 0 | |

2. EXCESS CLAIM FEES

| Fee Description | Fee (\$) | Small Entity Fee (\$) |
|--|----------|-----------------------|
| Each claim over 20 (including Reissues) | 50 | 25 |
| Each independent claim over 3 (including Reissues) | 200 | 100 |
| Multiple dependent claims | 360 | 180 |

Total Claims Extra Claims Fee (\$)

Fee Paid (\$)

- 20 or HP = x =

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims Extra Claims Fee (\$)

Fee Paid (\$)

- 3 or HP = x =

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets Extra Sheets Number of each additional 50 or fraction thereof Fee (\$)

Fee Paid (\$)

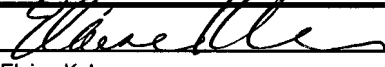
- 100 = / 50 = (round up to a whole number) x =

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): Post Issuance Fee - Certificate of Correction for Applicant's Mistake 100.00

SUBMITTED BY

Signature  Registration No. (Attorney/Agent) 41,936 Telephone 408-544-7591
Name (Print/Type) Elaine K. Lee Date May 1, 2007

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

MAY 11 2007

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : US 7,178,117

APPLICATION NO.: 10/821,466

ISSUE DATE : 2/13/07

INVENTOR(S) : Yu, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

TITLE PAGE (75) Inventor(s): Zunghang Yu should read Zunhang Yu.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Altera Corporation
101 Innovation Drive
San Jose, CA 95134

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

MAY 11 2007



US007178117B1

(12) **United States Patent**
Yu et al.

(10) **Patent No.:** **US 7,178,117 B1**(45) **Date of Patent:** **Feb. 13, 2007**

(54) **APPARATUS AND METHOD FOR RTL
BASED FULL CHIP MODELING OF A
PROGRAMMABLE LOGIC DEVICE**

(58) **Field of Classification Search** 716/1-2,
716/4-7, 16, 18; 703/23
See application file for complete search history.

(75) **Inventors:** Zunghang Yu, Sunnyvale, CA (US);
Ninh Ngo, San Jose, CA (US); Guy
Dupenloup, Redwood City, CA (US)

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,911,061 A * 6/1999 Tochio et al. 703/23
6,651,225 B1 * 11/2003 Lin et al. 716/4
2004/0268288 A1 * 12/2004 Bajuk et al. 716/16

* cited by examiner

Primary Examiner—Paul Dinh
Assistant Examiner—Suresh Memula

(73) **Assignee:** **Altera Corporation**, San Jose, CA
(US)

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 170 days.

(21) **Appl. No.:** **10/821,466**

(22) **Filed:** **Apr. 8, 2004**

(51) **Int. Cl.**
G06F 17/50 (2006.01)
G06F 9/45 (2006.01)
H03K 17/693 (2006.01)

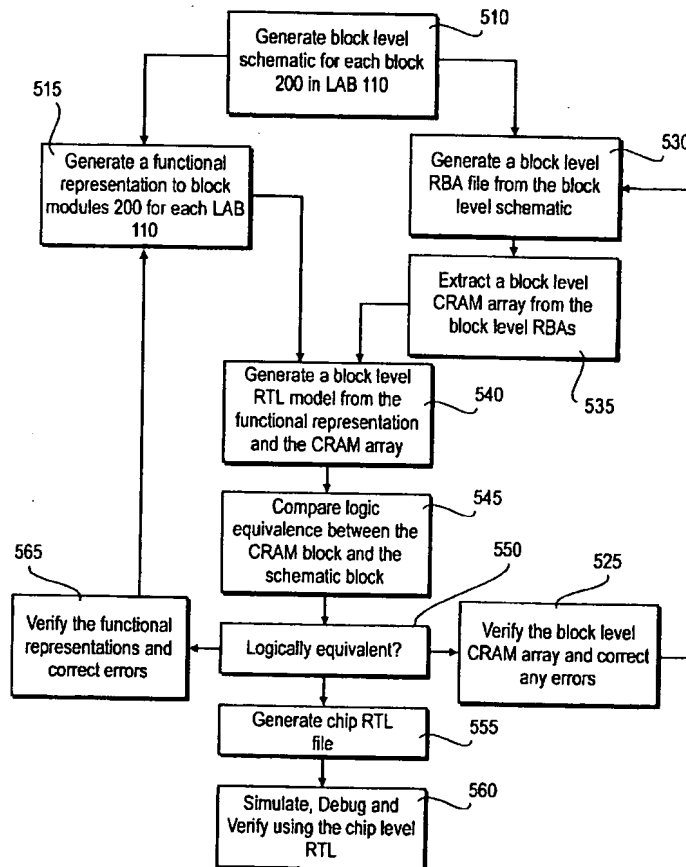
(52) **U.S. Cl.** **716/5; 716/1; 716/4; 716/16**

(57) **ABSTRACT**

An RTL representation for a LAB is generated. A full chip
RTL model is then generated using a plurality of the LAB
RTLs. Using the full chip RTL model, a full chip simulation
of the PLD chip is performed to verify and debug the
electronic design.

15 Claims, 10 Drawing Sheets

Zunghang Yu



MAY 11 2007